REMARKS

The following remarks are provided in further support of the Claims.

I. REJECTIONS

Rejection under 35 U.S.C. §112, second paragraph:

Claims 1-19 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Regarding claims 1-19, there are too many limitations as being indefinite for failing to particularly point out and distinctly claim the subject matter.

Rejection under 35 U.S.C. §102(e):

Claims 1-4 and 7-9 are rejected under 35 U.S.C. 102(e) as being anticipated by Dubbert et al (U.S. 6,836,240).

II. DISCUSSION (Regarding Claims 1 – 19: Rejection under 35 USC 112, second paragraph)

Claims 1 through 13 have been amended to particularly point out and distinctly claim the subject matter. In addition, claims 14-19 have been cancelled. Claims 1 through 13 are now considered to be definite and in allowable form.

III. DISCUSSION (Regarding Claims 1-4 and 7-9: Rejection under 35 U.S.C. 102(e) as being anticipated by Dubbert et al (U.S. 6,836,240))

The Office cites rejection of claims 1-4 and 7-9 under 35 U.S.C. 102(e) as being anticipated by Dubbert et al (U.S. patent 6,836,240). Respectfully, however, there are significant differences between the cited reference and the present invention which are identified in the following paragraphs.

The cited reference generally identifies three methods for reducing the effects of local oscillator (LO) feed-through energy, including:

(1) compensating for LO feed-through identifies predistorting the single sideband (SSB) mixer input signal of a radar system in a manner complementary to its own distortion by applying undithered DC biases to the SSB mixer such that the SSB mixer output approaches an ideal signal (see Col. 11 line1 through Col. 12 line 27 and FIGURE 6 of Dubbert);

(2a) separating LO feed-through in frequency identifies filtering a generated signal with a realizable reconstruction filter (see 1110 in FIGURE 11, Dubbert), then modulating upwards to an intermediate carrier frequency, and then, the extra sideband is filtered with a sideband filter (see 1120, Dubbert) leaving the desired sideband (see Col. 14 line 21 through Col. 15 line 62 and FIGUREs 11 and 12 of Dubbert);

(2b) separating LO feed-through in Doppler identifies modulating the LO feed-through term by application of a 0 or π radian phase shift, and then Doppler filtering to remove the LO feed-though energy that is centered around the onehalf pulse repetition frequency (see Col. 15 line 63 through Col. 17 line 2, and FIGUREs 13 and 14 of Dubbert); and

(3) estimating LO feed-through parameters identifies estimating the parametric values of LO feed-through using measurements of the video signal, which are then be used to compensate the unwanted LO feed-through energy (see Col. 18 line 60 through Col. 20 line 64 of Dubbert).

In contrast to the cited reference, the present invention implements a digital domain solution to correct LO leakage that is based upon increasing the effective precision of DC offsets. By applying dithering to DC offsets, precision DC biases are achieved, combined with generated bitstreams and input to QDWS DACs, and consequently, correct LO leakage in the radio frequency (RF) transmission of a radar system.

In the method (1) of the cited reference, undithered DC biases are applied in the analog domain to the input of the radar system's SSB mixer in order to suppress LO leakage. In contrast and as stated in the previous paragraph, the present invention utilizes a digital domain solution that increases the effective precision of DC offsets by applying dithering to achieve precision DC biases. These precision DC biases are combined with generated bitstreams and applied to the inputs of QDWS DACs, and consequently, correct LO feed-through.

In contrast to the method (2a) of the cited reference, the present invention does not utilize analog filter techniques that separate desired signal components from undesired LO feed-through. Rather, as stated previously, the present invention utilizes a digital domain solution that increases the effective precision of

DC offsets by applying dithering to achieve precision DC biases. These precision DC biases are combined with generated bitstreams and applied to the inputs of QDWS DACs, and consequently, correct LO feed-through.

In contrast to method (2b) of the cited reference, the present invention does not utilize Doppler separation and filter techniques that remove undesired LO feed-through from desired signal components. Rather, as stated previously, the present invention utilizes a digital domain solution that increases the effective precision of DC offsets by applying dithering to achieve precision DC biases. These precision DC biases are combined with generated bitstreams and applied to the inputs of QDWS DACs, and consequently, correct LO feed-through.

And, in contrast to method (3) of the cited reference, the present invention does not utilize received video during operation to create estimates for minimizing LO feed-through. Rather, as stated previously, the present invention utilizes a digital domain solution that increases the effective precision of DC offsets by applying dithering to achieve precision DC biases. These precision DC biases are combined with generated bitstreams and applied to the inputs of QDWS DACs, and consequently, correct LO feed-through.

Further, the cited reference does not disclose an apparatus with a dither applied to DC offsets which are input to the QDWS DACS. The present invention discloses pseudo-random noise dithers applied to DC offsets in order to increase the effective precisions of the DC offsets and achieve the precision DC biases. These precision DC biases are combined with QDWS generated bitstreams (in-phase and quadrature-phase) and applied to the inputs of QDWS DACs, and consequently, correct LO feed-through. Thus, the present invention identifies an apparatus that is capable of consistently suppressing LO leakage to at least -75 dBc.

Note that the developments of the cited reference, U.S. patent 6,836,240, and the present invention have been assigned to the same assignee: Sandia Corporation, Albuquerque, New Mexico. Please refer to the attached Terminal Disclaimer to address the extent of any overlap between the current invention and the cited reference.

Respectfully, in view of these significant differences between the U.S. patent 6,836,240 and the present invention, the U.S. patent 6,836,240 invention does not teach every element of the present invention, does not disclose an equivalent to, nor does it anticipate the present invention as described in the claims 1 through 13.

CONCLUSION

Applicants have responded to each and every rejection raised by the Office, and have amended claims 1-13 for allowable subject matter, and, in concurrent with the Office, consider that claims 1-13 are now in condition for allowance. Applicants respectfully request expeditious processing to issuance. The Office is authorized to charge Deposit Account # 19-0131 for any necessary fees regarding this response.

Respectfully submitted,

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